

MARINE NEMATODES--
LITTLE-KNOWN, WIDELY-DISTRIBUTED DENIZENS OF THE DEEP.

1

A. C. Tarjan

An early nematologist, N. A. Cobb, who is regarded as the "Father of American Nematology" by many of us, once wrote "...if all the matter in the universe except nematodes were swept away, our world would still be dimly recognizable...we would find its mountains, hills, valleys, rivers, lakes and oceans represented by a film of nematodes," hereafter referred to as "nemas." Plant and animal nematology has already focussed attention of the scientific community on the nematode parasites which are studied by those sciences. Free-living terrestrial nemas have also received a fair amount of attention from taxonomists and ecologists in various parts of the world. Nemas in aquatic environments, and particularly marine nemas, remain relatively unstudied even though they can be very abundant and sometimes occur by the millions in just a square meter of marine substrate. Perhaps the principal reason they have been either overlooked or disregarded is that many are small and may be missed when working with a sample. They often live in intertidal muds, and similar mucky substrates, from which they are separated with difficulty. They are regarded by some marine biologists as the most abundant metazoan (many-celled small animal) found in certain waters and are considered an important link in the marine "food chain", where bigger animals feed on smaller animals ad infinitum. They occur in a wide range of habitats, having been found in thermal waters as well as in the Antarctic. An old bottle half-buried in the sand, a partly-decayed sponge washed ashore, or a half-submerged alga-covered concrete piling can often yield numerous species of marine nemas co-existing in such atypical environments. Some marine nemas eat bacteria, algae, and detritus or other inert organic matter, while others are ferocious predators feeding on other nematodes and microorganisms of a small size.

The bodies of marine nematodes can be radically different from their terrestrial or animal-parasite relatives. Many carry long setae (antenna-like structures) (Fig. 1a-d), some have ocelli (colored "eye-spots"), most of them have spinnerets used to attach their tails to some solid substrate (Fig. 1b), a few have demanian systems (complicated tubes and openings associated with the female nema's reproductive system), and almost all have spectacular amphids (chemical sensory organs located at the head end) (Fig. 1c,d,f) that are quite distinctive in the phylum Nematoda. The diversities among these structures are adequate to classify marine nematodes into 5 major groups (orders). The enoplids (Fig. 1e) usually are big, mainly predatory and with large mouths and smooth bodies. The chromadorids are a somewhat diversified group containing fearsome-looking and misshapen "dragon" nemas (draconematids) (Fig. 2a), nemas appearing to wear a suit of armor (ceramonematids), and nemas with their bodies covered with dots (punctations), cross hatching or longitudinal lines (chromadorids). The desmoscolicids (Fig. 2b) are small, weird-looking animals with bodies made up of heavy rings (annules) that often are covered with incrustations or scales. The monhysterids (Fig. 2c) are all similar in having a circular amphid (chemical sensory organ), while the araeolaimids (Fig. 2d) are usually the group

1

Professor of Nematology, University of Florida, IFAS, Department of Entomology and Nematology, Nematology Lab., Bldg. 78, Gainesville, FL 32611

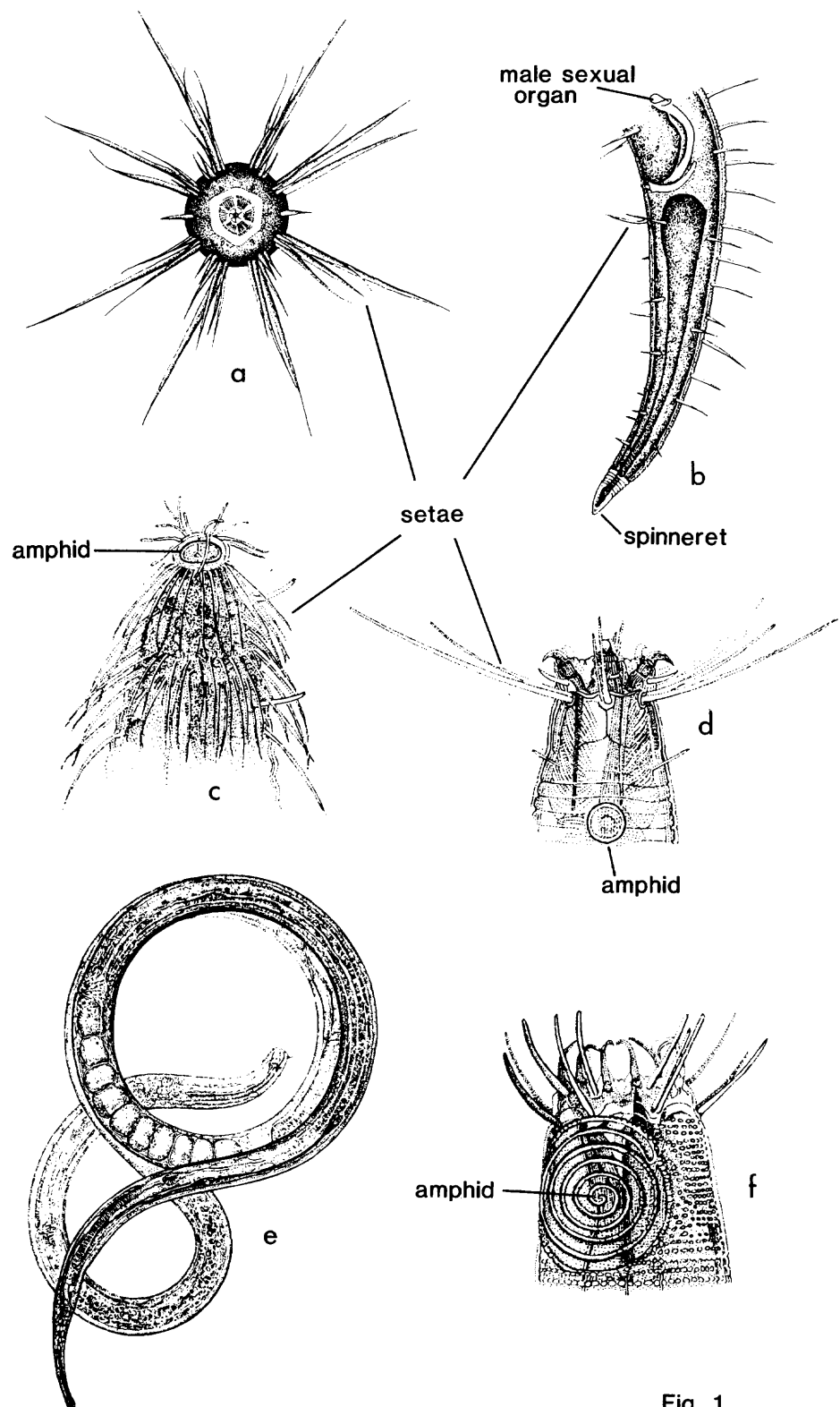


Fig. 1

Fig. 1. Diagrammatic illustrations of nematode morphology. a. view of head end showing setae; b. male tail showing spicules (copulatory organs) at upper end and spinneret with accompanying caudal glands at tip of tail; c. nematode head showing numerous setae and an elliptical amphid; d. nematode head showing long setae and a circular amphid; e. a typical enoplid; f. nematode head showing a large spiraled amphid.

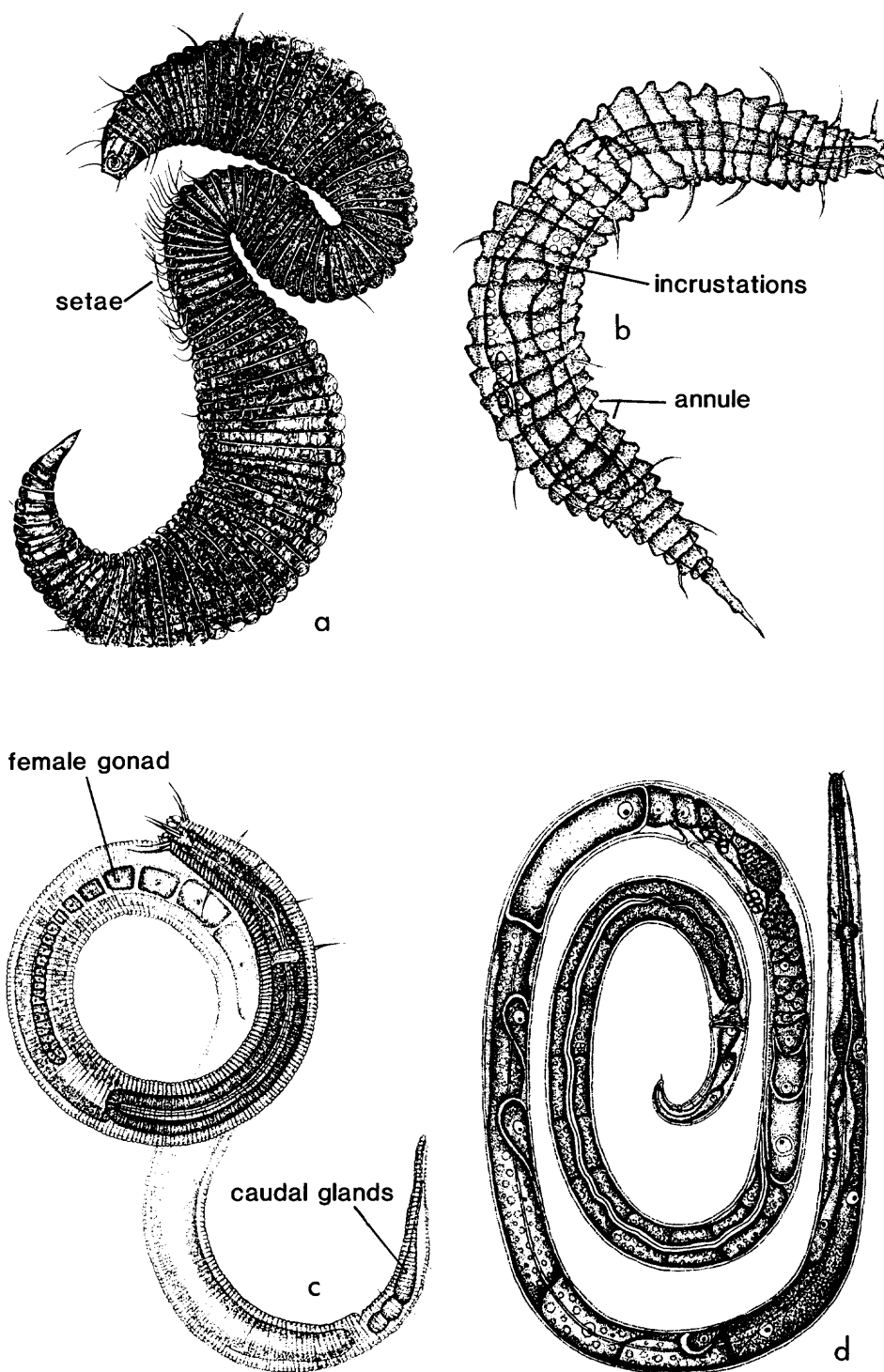


Fig. 2

Fig. 2. Illustrations of nematode orders. a. a draconematid belonging to the Chromadorida; b. a desmoscolicid; c. a monhysterid; d. an araeolaimid.

into which species that are not referable to the four other groups are placed. The araeolaimids contain species that can have unusual loop-like amphids, gaping mouths, or mouths containing spear-like rods. Sizes of these nemas vary, ranging from less than 500 μ m, which cannot be seen with the unaided eye, to more than 15 mm, easily seen with the naked eye.

Marine nemas have been found to be good indicators of pollution in marine sites. Their high numbers in marine muds and sediments has instigated research which showed that they are indeed a link in the "food chain." It is inevitable that future studies on these numerous, widely-spread marine organisms will reveal additional interesting details about them.

References:

1. Heip, C., M. Vincx, N. Smol, and G. Vranken. 1982. The systematics and ecology of free-living marine nematodes. *Helminth. Abst.* 51:1-31.
2. _____, _____, and G. Vranken. 1985. The ecology of marine nematodes. *Oceanogr. Mar. Biol. Ann. Rev.* 23:399-489.
3. Tarjan, A. C. 1980. An illustrated guide to the marine nematodes. *Inst. Food Agri. Sci., Univ. Fla.* 212 pp.